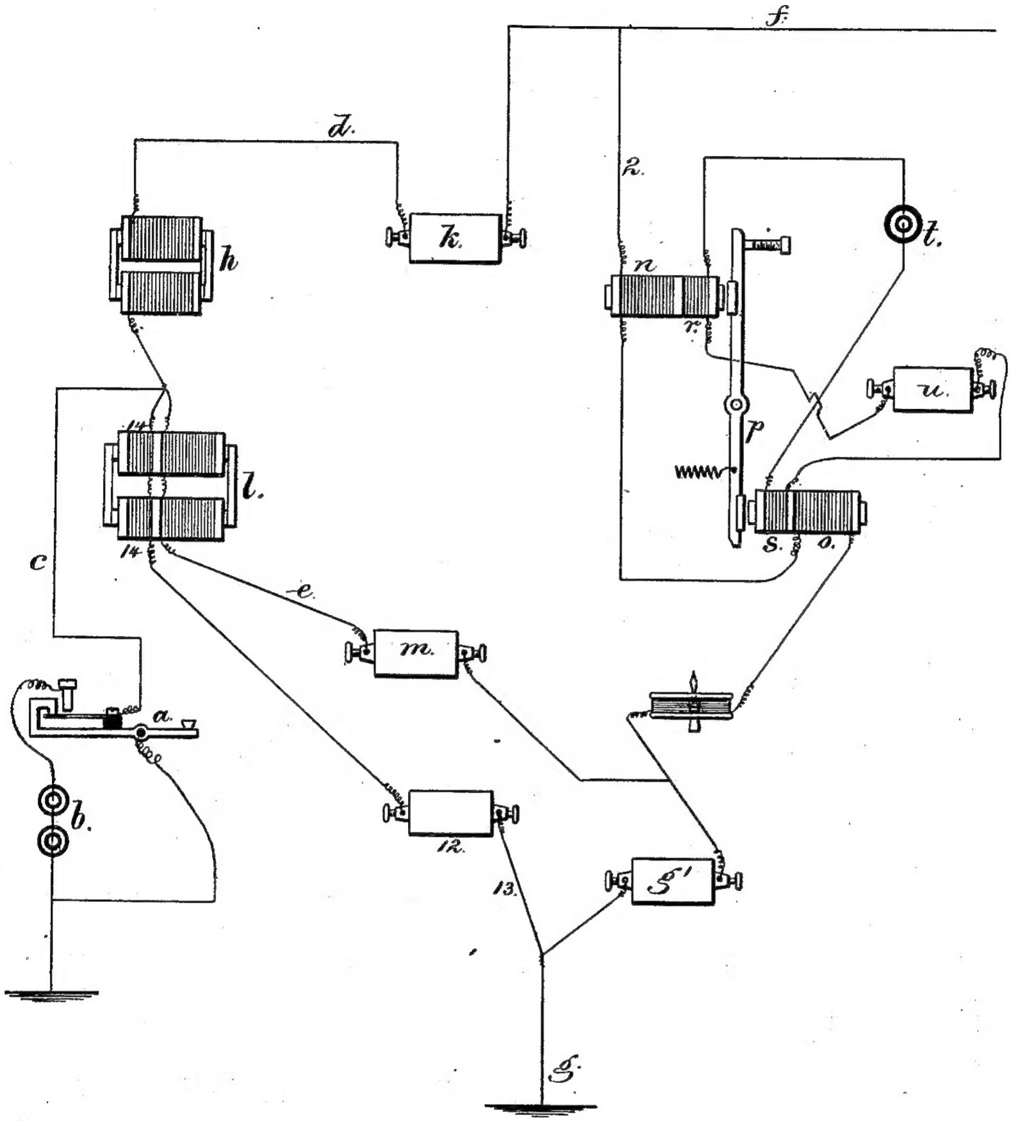
T. A. EDISON.

Duplex Telegraph.

No. 168,385.

Patented Oct. 5, 1875.



Witnesses

Chas H. Smith

Geo. T. Pinckney

Thomas A. Edison

per Lemuel W. Serrell

atty

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN DUPLEX TELEGRAPHS.

Specification forming part of Letters Patent No. **168,385**, dated October 5, 1875; application filed January 26, 1875.

CASE 111.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Newark, in the State of New Jersey, have invented an Improvement in Duplex Telegraphs, of which the following is a specification:

The object of this invention is to more perfectly balance and neutralize the static discharge of the line, so that there will not be any false pulsations.

In the accompanying diagram the pulsation is given at the sending-station by the circuit-preserving key *a*, battery *b*, and connections *c* to the bridge-wires *d e* between the line *f* and earth *g*. In the portion *d* of the bridge is the electro-magnet *h* and rheostat *k*, and in the portion *e* is the electro-magnet *l* and rheostat *m*, and the receiving-instrument is placed in the circuit 2 between the two portions *d e* of the bridge. Said receiving-instrument is made of two electro-magnets, *n o*, that are placed at opposite sides and ends of the armature-lever *p*, so as to act thereon in unison with each other, and the cores of these electro-magnets are extended and surrounded with the additional helices *r* and *s*, that are in a local circuit from the battery *t*, and provided with a rheostat, *u*, the object of this being to set up a sufficient magnetizing power in the helices of the local circuit to neutralize in the cores the magnetism that may result from permanent currents upon the line, thereby balancing such currents, and leaving the receiving-instrument free to respond to the pulsation from the distant instrument. This local circuit and helices also serve to neutralize any residual magnetism in the cores. This arrangement of electro-magnets and helices in a local circuit is not herein claimed, and it is set forth in a previous application made by me.

The electro-magnets *h l* set up in the triangular or bridge circuit *d e* 2 a secondary current when the circuit from *b* is broken, so as to neutralize the static discharge from the line *f* and artificial line *g g'*.

In consequence of the differences of condition between the actual line *f* and the artificial line *g g'*, it is difficult to adjust the rheostats *k m g'* so as to perfectly neutralize the static discharges, and equalize their action in the bridge *d e*, so that the receiving-instrument will be at a neutral point. To facilitate this operation we make use of a second artificial line, formed of a rheostat, 12, earth-connection 13, and helices 14, around the cores of the electro-magnet *l*, so that, the pulsation from *c* dividing, a portion goes through 14, 12, and 13, as well as through *h* and *l*, the result of which is that the cores of *l* are more highly energized than of *h*, and the reactionary or secondary current set up in *e* by *l* is increased to whatever extent may be required to equal the static discharge from the line circulating through *d* and the receiving-instrument.

I claim as my invention—

The electro-magnets *h* and *l*, placed in the bridge-circuit between the sending-instrument and the line and artificial lines, respectively, in combination with the second artificial line 12 13 and the helices 14 around the cores of the electro magnet *l*, for the purposes set forth.

Signed by me this 18th day of January, A. D. 1875.

THOS. A. EDISON.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.